## Mathematics > Differential Geometry

## Geometry of Darboux-Manakov-Zakharov systems and its application

Peter J. Vassiliou

(Submitted on 4 Feb 2010)

The intrinsic geometric properties of generalized Darboux-ManakovZakharov systems of semilinear partial differential equations \abel \{GDMZabstract\} \frac\{\partial^2 u\}\{\partial x_i|partial x_j\}=f_\{ij\}\Big (x_k,u,|frac\{\partial u\}\{\partial x_I\}\Big), $1 \backslash$ leq i<jlleq n, $k, \$ lin $\backslash\{1, \ldots, n \backslash\}$ for a real-valued function $\$ u\left(x \_1, \ldots, x \_n\right) \$$ are studied with particular reference to the linear systems in this equation class.
System (\ref\{GDMZabstract\}) will not generally be involutive in the sense of Cartan: its coefficients will be constrained by complicated nonlinear integrability conditions. We derive geometric tools for explicitly constructing involutive systems of the form (\ref\{GDMZabstract\}), essentially solving the integrability conditions. Specializing to the linear case provides us with a novel way of viewing and solving the multidimensional \$n\$-wave resonant interaction system and its modified version as well as constructing new examples of semi-Hamiltonian systems of hydrodynamic type. The general theory is illustrated by a study of these applications.

Subjects: Differential Geometry (math.DG); Mathematical Physics (mathph); Exactly Solvable and Integrable Systems (nlin.SI)
MSC classes: 58A17, 58A30, 58D19, 58J45, 35N05, 53B05
Cite as: arXiv:1002.0870v1 [math.DG]

## Submission history

From: Peter Vassiliou [view email]
[v1] Thu, 4 Feb 2010 00:22:31 GMT (39kb)
Which authors of this paper are endorsers?

## Download:

- PDF
- PostScript
- Other formats

Current browse context:
math.DG
< prev | next >
new | recent | 1002
Change to browse by:
math
math-ph
nlin
nlin.SI

## References \& Citations

- CiteBase

Bookmark(what is this?)
x CiteULike logo
Connotea logo
BibSonomy logo

Mendeley logo

Facebook logo
del.icio.us logo
Digg logo
Reddit logo

Link back to: arXiv, form interface, contact.

